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Science and Technology for Tomorrow's Air and Space Force

Success Story

INITIAL SCRAMJET FUELS TESTING COMPLETED

The Propulsion Directorate has completed initial combustion/heat sink evaluation on alternative scramjet fuels. The JP-8, a low-cost, widely available aviation jet fuel performed well, making this fuel a viable option for high-performance, hydrocarbon-fueled scramjet engines.

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Accomplishment

The directorate tested candidate fuels to be used in future scramjet engines. The tests, conducted at the United Technologies Research Center in East Hartford, Connecticut, examined the endothermic cooling capacity of the fuels and evaluated ignition and operability characteristics at simulated Mach 5 conditions. The fuels tested included JP-7, JP-8, JP-10, and n-octane. Preliminary results indicated JP-8 could support operation in the high-performance range, reducing scramjet fuel cost since JP-8 is widely available and relatively inexpensive. The National Aeronautics and Space Administration Glenn Research Center cofunded these tests through their Advanced Propellants program.

Background

While today's top performing systems typically operate in the Mach 0 to 3 range, new hypersonic systems could provide much faster response to adversary activities with the ability to attack time-critical targets at long range. Hydrocarbon-fueled scramjets that operate in the Mach 4 to 8 regime have near-term application to high-speed missiles and are an enabling technology for access-to-space programs.

Propulsion
Support to the Warfighter

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (04-PR-10)